

# Insecticidal constituents from rhizomes of *Zingiber cassumunar* and *Kaempferia rotunda*

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## Abstract



Rhizomes from 18 different species of the Zingiberaceae were screened for insecticidal constituents against neonate larvae of the pest insect, *Spodoptera littoralis*. Extracts from rhizomes of *Kaempferia rotunda* and *Zingiber cassumunar*, when incorporated into artificial diets, displayed significant insecticidal activity in chronic feeding bioassays at concentrations of 2500 ppm and 1250 ppm, respectively. Bioassay-guided isolation afforded two phenylbutanoids from rhizomes of *Z. cassumunar* which had LC<sub>50</sub> values against neonate larvae of 121 and 127 ppm, respectively, in the chronic feeding bioassay. Both compounds were also active in the residue-contact bioassay (LC<sub>50</sub> values of 0.5 and 3.6 µg cm<sup>-2</sup>, respectively). The presence of oxygenated substituents (-OH or -OAc groups) in the side-chain nullified insecticidal activity. Rhizomes of *K. rotunda* yielded two active metabolites: benzyl benzoate and the cyclohexane derivative, crotepoxide. Compared to the bioactive phenylbutanoids from *Z. cassumunar*, crotepoxide was less active in the chronic feeding bioassay (LC<sub>50</sub>, 1450 ppm) and was inactive in the residue-contact bioassay. Benzyl benzoate, however, exhibited insecticidal activity only when applied topically (LC<sub>50</sub>, 5.6 µg cm<sup>-2</sup>) suggesting detoxification in the larval gut when applied orally.

**Subject-index terms:** *Kaempferia rotunda*; *Zingiber cassumunar*; Zingiberaceae; rhizomes; insecticidal constituents; *Spodoptera littoralis*

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